## REMARKS

Claims 1-10 and 24-26 are pending in the present application. The Examiner finally rejected claims 1-4, 9, 10 and 24-26 under 35 U.S.C. § 103(a) as being unpatentable over Maeda et al. (U.S. Patent No. 5,281,295) in view of Frankel et al. (U.S. Patent No. 6,019,848). Claims 5-8 were finally rejected under § 103(a) over Maeda and Frankel in view of certain other references. Applicants respectfully request that the Examiner reconsider the rejections.

Claim 1 is directed to a substrate processing apparatus. The apparatus comprises a plurality of chambers and an ozone generator. The ozone generator generates ozone-containing gas for processing substrates in the chambers.

The apparatus further comprises "a controller configured to determine demand for the ozone-containing gas based on a number of processing chambers processing with the ozone-containing gas, and configured to control the flow regulator to regulate a flow rate of the oxygen-containing gas being supplied to the ozone generator so that a flow rate of the ozone-containing gas being discharged from the ozone generator to be supplied to the processing chamber or chambers substantially corresponds to the ozone-containing gas demand." That is, the controller determines demand for ozone-containing gas based on the number of processing chambers processing and regulates the flow rate of *oxygen*-containing gas to the ozone generator so that the flow rate of the *ozone*-containing gas being discharged from the ozone generator substantially corresponds to the demand. In this manner, the apparatus tracks ozone generation to what is needed for processing.

Applicants respectfully request consideration of the rejection, because it is believed that the Examiner has not established a prima facie case of obviousness for at least two reasons. First, neither Maeda nor Frankel disclose the recited controller. Second, there is no motivation or suggestion to combine Maeda and Frankel. Each reason is addressed in detail below.

Neither Maeda nor Frankel discloses the recited controller.

Maeda is directed to a semiconductor fabrication system as illustrated in Fig. 1. Oxygen is provided to an ozone generator 10. The ozone generator 10 generates ozone and distributes the

ozone to devices 27a-e via branch piping 19a-e. As the Examiner has noted, Maeda fails to disclose a controller at all.

Frankel discloses a CVD apparatus 10 having a vacuum chamber 15 as illustrated in Fig. 1C. A gas supply panel 80 receives ozone from ozone generator 115 and delivers ozone to the chamber through line 83. The supply of the ozone is controlled through valve 96 and mass flow controller 100. Frankel discloses that a process gas control subroutine can adjust the flow rates of the gas supply lines as necessary (see Col. 18, lines 40-64).

In the previous amendment, Applicants noted Frankel does not disclose a controller that controls the oxygen-gas containing gas flow regulator. The control subroutine is applied downstream of the ozone generator to the mass flow controller 100. There is no disclosure of controlling the flow of oxygen-containing gas *upstream* of the ozone generator to meet the demand.

In response, the Examiner states at page 6 of the Office Action: "Applicant argues that Maeda et al. does not teach a controller and Frankel does not teach an oxygen-containing gas flow regulator. One cannot show nonobviousness by attacking references individually where the rejections are based on combination of references . . . . Frankel et al. teaches a controller that controls a gas source to ensure the necessary delivery gas flow rate of the source gas by controlling the flow of gases into precursor generator i.e. $O_2$ into an ozone generator (column 19, lines 17-22)."

With respect to the Examiner's first point relating to attacking the references individually, Applicants never argued that Frankel fails to teach an "oxygen-containing gas flow regulator." Rather, Applicants argued that Frankel fails to teach *a controller* that controls the flow regulator to regulate a flow rate of the oxygen-containing gas as recited in claim 1. Because Frankel does not disclose the recited controller and Maeda fails to disclose a controller at all, Applicants argued that a prima facie case of obviousness was not established.

With respect to the Examiner's second point that Frankel in fact does disclose the recited controller, Applicants respectfully disagree. Col. 19, lines 17-19, cited by the Examiner, discloses a control subroutine for obtaining "the necessary delivery gas flow rate." However, the control subroutine does not control a regulator that regulates a flow rate of an oxygen containing gas

for producing ozone based on the number of processing chambers processing, but rather a flow rate of an inert gas or a carrier gas. This is clear from the full paragraph in which the cited sentence appears:

> In some processes, an inert gas such as nitrogen or argon is flowed into a chamber 15 to stabilize the pressure in the chamber before reactive process gases are introduced. For these processes, process gas control subroutine 163 is programmed to include steps for flowing the inert gas into chamber 15 for an amount of time necessary to stabilize the pressure in the chamber, and then the steps described above would be carried out. Additionally, when a process gas is to be vaporized from a liquid precursor, for example TEOS, process gas control subroutine 163 would be written to includes steps for bubbling a delivery gas such as helium through the liquid precursor in a bubbler assembly, or introducing a carrier gas such as helium to a liquid injection system. When a bubbler is used for this type of process, process gas control subroutine 163 regulates the flow of the delivery gas, the pressure in the bubbler, and the bubbler temperature in order to obtain the desired process gas flow rates. As discussed above, the desired process gas flow rates are transferred to process gas control subroutine 163 as process parameters. Further, process gas control subroutine 163 includes steps for obtaining the necessary delivery gas flow rate, bubbler pressure, and bubbler temperature for the desired gas flow rate by accessing a stored table containing the necessary values for a given process gas flow rate. Once the necessary values are obtained, the delivery gas flow rate, bubbler pressure and bubbler temperature are monitored, compared to the necessary values and adjusted accordingly." (Col. 18, line 65 to Col. 19, line 25; emphasis added.)

The paragraph explains that the delivery gas is not an oxygen-containing gas for producing a process gas such as ozone based on the demand. The delivery gas is simply inert or functions as a carrier. Thus, the control of the flow rate of the delivery gas does not correspond to the controller recited in claim 1 that controls the flow rate of an oxygen-containing gas for producing ozone based on the number of processing chambers processing. Accordingly, Applicants respectfully submit that neither Maeda nor Frankel disclose the recited controller and that claim 1 is patentable over the references for failing to disclose all the recitations. (See MPEP 2143.02 noting that to "establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.")

No motivation to combine Maeda and Frankel

Applicants respectfully submit that the Examiner has failed to establish a prima facie case of obviousness for another reason. There is no motivation to combine Maeda and Frankel. Maeda is concerned about supplying processing gas in a uniform manner to dispersing devices even as the number of dispersing devices changes. (See, e.g., Col. 1, lines 51-63.) Fig. 1 illustrates that this objective is achieved through the use of exhaust pipes. The ozone generated by the ozone generator 10 is delivered toward the five dispersing devices 27a-e through corresponding branch piping 19a-e. If gas should not be delivered to a given dispersing device, such as 27a, the gas is diverted via a switch (24a) to the exhaust through a corresponding exhaust piping (21a). Thus, the delivery of the gas to the remaining operational devices is not disrupted.

What is important here is that the ozone generator 10 generates ozone gas at a *constant* generating rate for five dispersing devices If one device is not to receive gas, the amount of ozone generated by the ozone generator is not adjusted to the change in demand. Rather, the flow of processing gas to that dispersing device is diverted to the exhaust. That is, Maeda generates a constant rate of ozone for five devices whether one device is operational or five devices are operational.

The Examiner contends that Maeda could be modified by the disclosure of Frankel. As discussed above, Frankel does not disclose controlling the flow rate of oxygen-containing gas supplied to the ozone generator. Even if it did, the modification proposed would change the operation principle of Maeda. Maeda is directed to a system in which the ozone generator generates at a constant rate. A change in demand is addressed by a switch at each dispersing device rather than at the source of ozone generation. Thus, to provide control of the oxygen inputted to the ozone generator 10 of Maeda to address demand changes, as the Examiner proposes, would render the entire switch/exhaust system of Maeda pointless. Such a change to the operation principle of Maeda teaches against the combination of Maeda and Frankel and, thus, precludes a finding of obviousness. (See MPEP 2143.01(IV) noting that if "the proposed modification or combination of the prior art

would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.")

Finally, Applicants respectfully submit that modification proposed by the Examiner also fails, because Frankel fails to discuss the recited control. Claim 1 recites that the controller is configured "to determine demand for the ozone-containing gas based on a number of processing chambers processing with the ozone-containing gas." The control cited by the Examiner is directed to a single chamber operation. For example, Fig. 1C illustrates a single chamber 15. As has been noted, Frankel does disclose the use of multi-chamber systems, but it fails to disclose a control subroutine for such a system to control the ozone generation. It instead discloses adding additional ozone generators. (See, e.g., Col. 16, lines 44-49.)

The Examiner has noted that claim 9 of the present application recites the use of additional ozone generators. It is believed that claim 9 is not inconsistent with the Applicants' position above with respect to Frankel. Additional ozone generators can be added when the ozone-generating capacity of the claimed ozone generator is exceeded. This is different than when, as in Frankel, the ozone generator *has* the capacity to meet the demand in a multi-chamber system, but the disclosure still advocates adding more generators to increase output.

Accordingly, for all the reasons set forth above, Applicants respectfully submit that claims 1-4, 9, 10 and 24-26 are patentable over Maeda and Frankel.

The remaining rejections.

The Examiner rejected claims 5-8 under 35 U.S.C. § 103(a) as being unpatentable over Maeda and Frankel in view of Harada, Harvey and/or Toshima. All three were merely cited for recitations in the dependent claims, and it is believed that they do not make up for the deficiencies of Maeda and Frankel.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If, for any reason, the Examiner finds the application other than in condition for allowance, Applicants request that the Examiner contact the undersigned attorney at the Los Angeles telephone number (213) 892-5630 to discuss any steps necessary to place the application in condition for allowance.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing Docket No. 1993720051.00.

Dated: June 23, 2006

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